A

Attorney's Docket No. _____ ***PATENT***

Box Patent Application
Commissioner of Patents and Trademarks
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Sang G. Song

WARNING: *Patent must be applied for in the name(s) of all of the actual inventor(s). 37 CFR 1.41(a) and 1.53(b).*

For (title): Decorative Stickers from Inkjet Printing and Method Therefor

1. Type of Application

This new application is for a(n) *(check one applicable item below)*:

XXX☒ Original

☐ Design

☐ Plant

WARNING: Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. 371(c)(4) unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

NOTE: If one of the following 3 items apply, then complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED and a NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION.

☐ Divisional.

☐ Continuation.

☐ Continuation-in-part (C-I-P).

CERTIFICATION UNDER 37 CFR 1.10

I hereby certify that this New Application Transmittal and the documents referred to as enclosed therein are being deposited with the United States Postal Service on this date October 20, 1999 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number EF517630698US addressed to the: Commissioner of Patents and Trademarks, Washington, D.C. 20231.

Ben E. Lofstedt
(type or print name of person mailing paper)

(Signature of person mailing paper)

NOTE: Each paper or fee referred to as enclosed herein has the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 CFR 1.10(b).

WARNING: *Certificate of mailing (first class) or facsimile transmission procedures of 37 CFR 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.*

2. Benefit of Prior U.S. Application(s) (35 U.S.C. 120)

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., then check the following item and complete and attach ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

☐ The new application being transmitted claims the benefit of prior U.S. application(s) and enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed Which Are Required For Filing Date Under 37 CFR 1.53(b) (Regular) or 37 CFR 1.153 (Design) Application

16 Pages of specification

1 Pages of claims

1 Pages of Abstract

1 Sheets of drawing

☐ formal

☒ informal

WARNING: DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. Comments on proposed new 37 CFR 1.84. Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page." 37 C.F.R. 1.84(c)).

(complete the following, if applicable)

☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)". 37 C.F.R. 1.84(b).

4. Additional papers enclosed

☐ Preliminary Amendment

☐ Information Disclosure Statement (37 CFR 1.98)

☐ Form PTO-1449

☐ Citations

☐ Declaration of Biological Deposit

☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.

☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative

☐ Special Comments

☐ Other

5. Declaration or oath

☒ Enclosed

executed by *(check all applicable boxes)*

☒ inventor(s).

☐ legal representative of inventor(s). 37 CFR 1.42 or 1.43

☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.

☐ this is the petition required by 37 CFR 1.47 and the statement required by 37 CFR 1.47 is also attached. *See item 13 below for fee.*

☐ Not Enclosed.

WARNING: Where the filing is a completion in the U.S. of an International Application but where a declaration is not available or where the completion of the U.S. application contains subject matter in addition to the International Application the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

☐ Application is made by a person authorized under 37 CFR 1.41(c) on behalf of *all the above named inventor(s).* (The declaration or oath, along with the surcharge required by 37 CFR 1.16(e) can be filed subsequently).

NOTE: It is important that all the correct inventor(s) are named for filing under 37 CFR 1.41(c) and 1.53(b).

☐ Showing that the filing is authorized. *(Not required unless called into question. 37 CFR 1.41(d).*

6. Inventorship Statement

WARNING: If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

☒ The same

or

☐ Are not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,

☐ is submitted.

☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. A verified English translation of the non-English language application and the processing fee of $130.00 required by 37 CFR 1.17(k) is required to be filed with the application or within such time as may be set by the Office. 37 CFR 1.52(d).

NOTE: A non-English oath or declaration in the form provided or approved by the PTO need not be translated. 37 CFR 1.69(b).

☒ English

☐ non-English

☐ the attached translation is a verified translation. 37 CFR 1.52(d).

8. Assignment

☐ An assignment of the invention to _____

☐ is attached. A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.

☐ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters-one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: A newly executed "CERTIFICATE UNDER 37 CFR 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

9. Certified Copy

Certified copy(ies) of application(s)

(country)	*(appln. no.)*	*(filed)*
(country)	*(appln. no.)*	*(filed)*
(country)	*(appln. no.)*	*(filed)*

from which priority is claimed

☐ is (are) attached.

☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 CFR 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. 120 is itself entitled to priority from a prior foreign application then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 CFR 1.16)

A. ☒ Regular application

CLAIMS AS FILED				
Number filed	Number Extra		Rate	Basic Fee 37 CFR 1.16(a) $710.00
Total Claims (37 CFR 1.16(c))	−20=	X	$ 22.00	— 0 —
Independent Claims (37 CFR 1.16(b))	−3=	X	$ 74.00	— 0 —
Multiple dependent claim(s), if any (37 CFR 1.16(d))		+	$230.00	— 0 —

☐ Amendment cancelling extra claims enclosed.

☐ Amendment deleting multiple-dependencies enclosed.

☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 CFR 1.16(d).

Filing Fee Calculation $ 760

B. ☐ Design application
($290.00—37 CFR 1.16(f))

Filing Fee Calculation $_____

C. ☐ Plant application
($480.00—37 CFR 1.16(g))

Filing fee calculation $_____

11. Small Entity Statement(s)

☒ Verified Statement(s) that this is a filing by a small entity under 37 CFR 1.9 and 1.27 is(are) attached.

Filing Fee Calculation (50% of A, B or C above) $ 380

NOTE: Any excess of the full fee paid will be refunded if a verified statement and a refund request are filed within 2 months of the date of timely payment of a full fee. 37 CFR 1.28(a).

12. Request for International-Type Search (37 CFR 1.104(d)) *(complete, if applicable)*

☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made At This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time. (*This and the surcharge required by 37 CFR 1.16(e) can be paid subsequently.*)

☒ Enclosed

☒ basic filing fee $ 380

☐ recording assignment
($40.00; 37 CFR 1.21(h)) (See attached "COVER SHEET FOR ASSIGNMENT ACCOMPANYING NEW APPLICATION".)

☐ petition fee for filing by other than all the inventors or person on behalf of the inventor where inventor refused to sign or cannot be reached. ($130.00; 37 CFR 1.47 and 1.17(h)) $_____

☐ for processing an application with a specification in a non-English language. ($130.00; 37 CFR 1.52(d) and 1.17(k) $_____

☐ processing and retention fee
($130.00; 37 CFR 1.53(d) and 1.21(l))

☐ fee for international-type search report ($40.00; 37 CFR 1.21(e)). $_____

NOTE: 37 CFR 1.21(l) establishes a fee for processing and retaining any application which is abandoned for failing to complete the application pursuant to 37 CFR 1.53(d) and this, as well as the changes to 37 CFR 1.53 and 1.78, indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid or the processing and retention fee of § 1.21(l) must be paid within 1 year from notification under § 53(d).

Total fees enclosed $ 380

14. Method of Payment of Fees

☒ Check in the amount of $ 380

☐ Charge Account No. _____ in the amount of $_____. A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 CFR 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: *If no fees are to be paid on filing the following items should not be completed.*

WARNING: *Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.*

☐ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. _____:

☐ 37 CFR 1.16(a), (f) or (g) (filing fees)

☐ 37 CFR 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 CFR 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☐ 37 CFR 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☐ 37 CFR 1.17 (application processing fees)

WARNING: While 37 CFR 1.17(a), (b), (c) and (d) deal with extensions of time under § 1.136(a) this authorization should be made only with the knowledge that: "Submission of the appropriate extension fee under 37 C.F.R. 1.136(a) is to no avail unless a request or petition for extension is filed." (Emphasis added). Notice of November 5, 1985 (1060 O.G. 27).

☐ 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b))

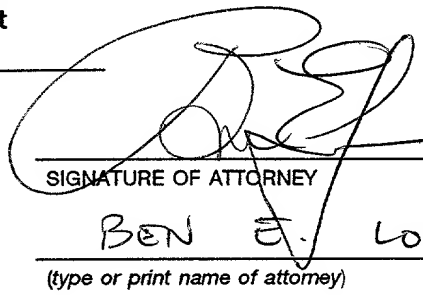
NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 CFR 1.311(b).

NOTE: 37 CFR 1.28(b) requires "Notification of any change in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . issue fee". From the wording of 37 CFR 1.28(b): (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions As To Overpayment

☐ Credit Account No. _____

☐ Refund



SIGNATURE OF ATTORNEY

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BEN E. LOFSTEDT

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FULLERTON, CA 92831

☐ **Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

☐ Plus Added Pages For New Application Transmittal Where Benefit Of Prior U.S. Application(s) Claimed

Number of pages added_____

☐ Plus Added Pages For Papers Referred To In Item 4 Above

Number of pages added_____

☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added_____

☐ **Statement Where No Further Pages Added**

(If no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item:)

☒ This transmittal ends with this page.

Attorney's Docket No. _____ ***PATENT***

Applicant or Patentee: Sang G. Song

Serial or Patent No.: 0 / (Filed concurrently herewith)

Filed or Issued: (Filed Concurrently herewith)

For: Decorative Stickers From Injet Printing Application and Method Therefor

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(b))—INDEPENDENT INVENTOR

As a below named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled Decorative Stickers from Inkjet Printing Application and Method therefor described in

XX☒ the specification filed herewith.

☐ application serial no. 0 / _____, filed _____.

☐ patent no. _____, issued _____.

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

XX☒X no such person, concern, or organization

☐ persons, concerns or organizations listed below *

**NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27).*

FULL NAME _____

ADDRESS _____

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____

ADDRESS _____

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

FULL NAME _____

ADDRESS _____

☐ INDIVIDUAL ☐ SMALL BUSINESS CONCERN ☐ NONPROFIT ORGANIZATION

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Sang G. Song

Name of inventor

Sang G. Song

Signature of Inventor

Date 10/20/99

Name of inventor

Signature of Inventor

Date

Name of inventor

Signature of Inventor

Date

BACKGROUND OF THE INVENTION:

1. Field of the Invention:

The present invention relates to the manufacture of stickers, and the like, and, more specifically, to environmentally compatible, biodegradable stickers with vibrant colors and decorations thereon applied by inkjet printer methods.

2. Description of the Prior Art:

In the relatively conventional method of producing such articles of manufacture, such as stickers, silk screen printing technology is used to apply an adhesive layer on silicon coated paper, then using silk-screen printing to apply another layer of piastisol thereto. Then, the combination must be treated using a relatively high temperature heat blower to the combination.

One of the typical problems encountered in this prior art article of manufacture and the method for accomplishing it was that the heating process would not create one bonded layer. Consequently, the adhesive layer used to bond the sticker to another surface was not removable and reusable. As a result, some adhesive residue was left behind on the surface to which the sticker was adhesively attached to which was undesirable since the adhesive residue left on the surface had to be somehow removed. Oftentimes, merely scrubbing with water, or soap and water, did not remove the adhesive residue. If petrochemical liquids, such as nail polish remover

(typically acetone), alcohol, paint thinner, methyl ethyl ketone (MEK), turpentine, white (unleaded) gasoline, tri-chloroethylene (TRIC), or the like, would have to be used to remove the undesirable adhesive residue. Use of such petrochemical solvents oftentimes reacts harshly with colored materials by either removing some (or all) of the coloring from the material, or causes damage to the materials.

Additionally, use of the prior art method often produced irregularities in color, color brightness, contrast, imperfect bonding of between the adhesive and the plastisol resulted in image distortion of the decorative design especially when the sticker was removed from the original surface it was adhesively bonded to. When such occurs, the sticker is not usually considered reusable, and, hence, is tossed in the trash.

In the prior art, the silk screen process is used to create images on a resin layer. This is the method typically used on conventional printed ceramic tiles and in printing on, and in the use of vinyl printing. However, this prior art technique oftentimes does not produce ideal products due to inconsistency in the nature of the silk screen production processes. Consequently, this method is often considered to be not feasible for even small quantity production runs and due to its relative high cost especially since it is labor-intensive.

The present invention includes a new article of manufacture and a method for producing such new and useful article of manufacture. The net results is that the present invention overcomes significant portions of the problems found in the use of

prior art processes and methods. It accomplishes these highly desirable results by focusing on resolving the problems stemming from the use of traditional and conventional methods. The new article of manufacture and the method for producing such discovered by me enables stickers to be make which are both removable and reusable. No adhesive residue is eft on the surface to which the sticker is adhesively attached.

Furthermore, this process prevents ink from bleeding, smear, or spread with the use of the fast drying, small inkjet droplets used in modern inkjet printing technology. Consequently, by the use of this product and process for producing this article of manufacture, the applications are vastly increased and virtually any kind of images can be applied in the construction of the stickers. The resultant sticker construction retains excellent bonding and water resistant and scratch resistant properties, yet it maintains its elasticity as well. It also is used in creating any type of images perfectly using conventional inkjet printing methods. Use of the Inkjet printing method completely eliminates the multiple processing stages of silk screen printing and converts it down to just one stage. As a result, a new, improved sticker is constructed which is also low in cost, removable and reusable.

Still further, this new and unique product is also biodegradable because of the use of its ingredient, namely: polymer starch plastisol, which is added in during the emboss processing stage for protection and preservation of the inkjet produced image.

Not only does it protect and preserve, but it also greatly reduces color fade and sliding prevention.

SUMMARY OF THE INVENTION AND OBJECTS:

Fundamentally, the invention described herein consists of both an article of manufacture and the method for making such article, including an article of manufacture for the construction of environmentally compatible stickers which are decorated using inkjet printing methods comprising a polymer plastisol biodegradable rubber resin as its primary ingredient to form one layer from bonding multiple layers. This removable/reusable sticker can even be used for preventing one from slipping in the bathtub. It is environmental fnendly because of it is biodegradable. When the sticker is discarded, it simply biodegrades and becomes a genuine part of the landscape. The inkjet printing method application is also effective in reducing multiple numbers of manufacturing steps or processing stages to simply one in order to create vibrant custom inkjet produced images all at a relatively low cost.

Fundamently, the new article of manufacture for the production of stickers, and the like, involves the use of silicon coated paper. The printable side of the silicon coated paper is treated with a mixture of glue comprised of acrylic polymer binder and DOP (dioctyl phthalate) in order to give it a non-slippery texture. A removable and reusable decorative sticker is formed by screen printed adhesive layer and polymer plastisol - which is formed typically be a mixture of acrylic polymer binder, starch, PVC and DOP - layer which is then heated through infrared (I.R.) conveyor type dryer to produce a single, bonded layer of material.

To produce a decorative sticker having real-life-like photo images such can be manufactured or produced using the inkjet process. The application of real life-like photo images was not possible using silk screen processes which typically involve a multiple number of complicated processing stages which is expensive and imprecise resulting in a large variation of quality products.

DESCRIPTION OF THE PREFERRED EMBODIMENTS OF THE INVENTION:

With continued reference now to all of the drawings herein, there is shown both the new and unique article of manufacture and the method for making same.

The sticker produced is both removable and reusable, and it leaves no adhesive residue on the surface to which it was attached to when the sticker is removed.

] By the use of the inkjet printing process, the sticker can produce photo images conventionally not possible with silk screen process. Utilizing the ability to put any type of desired image, the sticker can be used for various type of applications, such as decorating kitchens, bathroom, window, ceramic tiles and as auto bumper stickers, and for indoor/outdoor advertisements.

Conventionally, images are printed on heat treated PVC (polyvinyl chloride) layer that was silk screen printed on top of a silk screen printed and applied adhesive material. However, these layers are prone to color fade and dullness as well as producing serious environmental pollution issues due to the non-biodegradable toxic character of the materials used.

This invention, upon much effort in research and development, applied excellent bonding properties ofDOP. Removable and reusable layer is achieved primarily by bonding ofDOP and adhesive through mixture of flop and acrylic polymer adhesive binder, 80:20 ratio, screen printed on silicon coated paper, which is then passed through I.R. conveyor dryer.

On top of adhesive plastisol layer, removable/reusable and transparent rubber plastisol film-like sheet is created with mixture ofplastisoi (PVC & DOP), acrylic polymer rubber resin and biodegradable starch resin, 80%, 10%, 0%, respectively, which is screen printed on top of adhesive layer and passed through i.R. Conveyor to bond.

Primary solution is the use ofinkjet printing method on removable/reusable plastisol film layer to produce high resolution image and to reduce number of processing stages. Embossing layer is screen printed to prevent damage to the image and color fading. In order for ink from inkjet printer to print flawlessly, softener is added to removable/reusable film sheet creating excellent removable/reusable inkjet printing sheet to be used for various purposes.

The bonding process of creating one plastisol film layer, when passed through I.R. conveyor (bio ceramic heater), obtains heat-resistant, cohesion properties as well as exceptional chemical mixture and superior absorption ofinkjet ink to print desired high quality image. Temperature o£I,R. conveyor varies in each stage from 120^0C to 150^0C for duration of 90 seconds,

5. Detailed Description

Description of Attached Drawing

A) Adhesive Layer (2) is screen printed on Silicon Coated Paper (1) then is heat dried,

B) Plastisol Filin Layer (3) is produced by screen printing polymer plastisol rubber resin, which is biodegradable and water & heat resistant, then is heat dried.

C) image (4) is printed by inkjet printing method

D) Embossing (5) is done by screen print and then heat dried.

Detailed Invention Description

1. Production 1

Acrylic polymer binder adhesive 80% and DOP 20% along with 5% of catalyst is mixed in stirrer. This mixture is put onto silicon coated paper by silk screen print method and is heat dried through ~.R. conveyor (60^0C 80^0C, 9oseconds), yielding adhesive layer, Uniformly even thickness of dried adhesive layer is maintained by measuring with thickness gauge.

2. Production 2

Plastisol (PVC 20%, flOP 30%) 50%

Acrylic polymer binder rubber resin 20%

Biodegradable starch resin 20%

Catalyst 10%

Above ingredients are mixed ~n orderly fash;on and processed with Tbree Roil Mill 3 times to make rubber plastisol.

3. ProductionS

[mage printed from inkjet printing method attains high resolution and unique texture, which is not possible with images created by silk screen print method.

4, Production 4

Final embossing gives various texture and unique color promotion to the decorative, removable and reusable sticker.

Manufacturing Process

1. Silicon Coated Paper
2. Polymer Adhesive Layer
3. Biodegradable Plastisol Film Layer
4. Inkjet Printing Image Layer (Multiple Color)
5. Plastisol Embossing Layer

Presented invention, adhesive decorative sticker, posses many ingenious characteristics. Its silicon coated base paper does not leave any residue on the sticker and the sticker itself does not leave any residue on the attaching surfaces when removed, yet retains strong adhesive property. Hence, the sticker is removable and reusable, The sticker's ingredient such as rubber plastisol filin layer has exceptional bonding quality, thereby maintaining the excellent structural stability and superb elasticity. Also, the sticker's unique printing medium. allows all kinds of photo-qu~ity image printing with inkjet print method, The sticker can be manufactured cost-effectively, making it ideal for small quantity sample productions to mass production. Its versatile attributes can be used in countless applications in various types of industries.

DECORATIVE STICKERS MADE FROM INKJET PRINTING APPLICATION

Name of Invention

Decorative Sticker made from inkjet printing

Invention Claims

- Silicon coated paper having printable side treated with mixture of glue comprised of acrylic polymer binder and DOP (dioctyl phthalate) giving slippery texture.
- Removable & reusable decorative sticker formed by screen printed adhesive layer and polymer plastisol (mixture of acrylic polymer binder, starch, PVC and DOP) layer heated through I.R. conveyer dryer to become one bonded layer.
- Decorative sticker with real-life-like photo image manufactured using inkjet process, which was not possible with silk screen process that involves multiple number of complicated processing stages.

Detailed Description of the Invention

1. Industrial Uses.

   The sticker is removable and reusable, and it leaves no residue on the surface it was attached to when removed. By using inkjet process, the sticker can produce photo images conventionally not possible with silk screen process. Utilizing the ability to put any type of desired image, the sticker can be used for various type of applications, such as decorating kitchens, bathroom, window, ceramic tiles and as auto bumper stickers, indoor/outdoor advertisement.

2. Conventional Technology and its Problems.

- Conventional method of first screen printing adhesive layer on coated paper and screen printing another layer of plastisol and then treating with high degree of heat did not form into one bonded layer and consequently did not have removable and reusable property and residue was left behind.
- Irregularities and imperfect bonding of adhesive and plastisol created image distortion when removed and hence not reusable.
- Utilizing silk screen process to create images on resin layer is used on conventional printed ceramic tiles and vinyl printing. However, these are not ideal products due to problems in production processes and non-feasibility for small quantity production and high cost.

5. Detailed Description

- This invention utilizes polymer plastisol biodegradable rubber resin as its primary ingredient to make one layer from bonding multiple layers. This removable/reusable sticker can even be used for preventing slippery in bathtub. And it is environmental friendly because of its biodegradable character when discarded. Inkjet printing method application is also effective in reducing number of processing stages and creating vibrant images at low cost.

Description of Attached Drawing

A) Adhesive Layer (2) is screen printed on Silicon Coated Paper (1) then is heat dried.
B) Plastisol Film Layer (3) is produced by screen printing polymer plastisol rubber resin, which is biodegradable and water & heat resistant, then is heat dried.
C) Image (4) is printed by inkjet printing method
D) Embossing (5) is done by screen print and then heat dried.

Detailed Invention Description

1. Production 1
Acrylic polymer binder adhesive 80% and DOP 20% along with 5% of catalyst is mixed in stirrer. This mixture is put onto silicon coated paper by silk screen print method and is heat dried through I.R. conveyor (60°C ~ 80°C, 90seconds), yielding adhesive layer. Uniformly even thickness of dried adhesive layer is maintained by measuring with thickness gauge.

2. Production 2

Plastisol (PVC 20%, DOP 30%)	50%
Acrylic polymer binder rubber resin	20%
Biodegradable starch resin	20%
Catalyst	10%

Above ingredients are mixed in orderly fashion and processed with Three Roll Mill 3 times to make rubber plastisol.

3. Production 3
Image printed from inkjet printing method attains high resolution and unique texture, which is not possible with images created by silk screen print method.

4. Production 4
Final embossing gives various texture and unique color promotion to the decorative, removable and reusable sticker.

- Conventionally, images are printed on heat treated PVC (polyvinyl chloride) layer that was silk screen printed on top of silk screen printed adhesive. But these layers are prone to color fade and dullness as well as serious environmental pollution issues due to its non-biodegradable toxic materials.

3. Solution

This invention focuses on resolving the problems stemming from conventional methods. New process enables stickers to be removable and reusable with no residue left on attaching surface. Furthermore, this process prevents ink from spreading with inkjet printing application and any kind of images can be expressed.
The sticker retains excellent bonding and water & scratch resistant properties, yet it maintains elasticity as well as creating any type of images perfectly using inkjet printing method. Inkjet printing method eliminates multiple processing stages of silk screen printing to just one stage, therefore enabling low cost removable and reusable stickers for consumers.
This product is also biodegradable because of its ingredient, polymer starch plastisol, added in emboss processing stage for image protection, and color fade and sliding prevention.

4. Invention Method

- This invention, upon much effort on R & D, applied excellent bonding properties of DOP. Removable and reusable layer is achieved primarily by bonding of DOP and adhesive through mixture of DOP and acrylic polymer adhesive binder, 80:20 ratio, screen printed on silicon coated paper, which is then passed through I.R. conveyor dryer.
- On top of adhesive plastisol layer, removable/reusable and transparent rubber plastisol film-like sheet is created with mixture of plastisol (PVC & DOP), acrylic polymer rubber resin and biodegradable starch resin, 80%, 10%, 10%, respectively, which is screen printed on top of adhesive layer and passed through I.R. Conveyor to bond.
- Primary solution is the use of inkjet printing method on removable/reusable plastisol film layer to produce high resolution image and to reduce number of processing stages. Embossing layer is screen printed to prevent damage to the image and color fading.
- In order for ink from inkjet printer to print flawlessly, softener is added to removable/reusable film sheet creating excellent removable/reusable inkjet printing sheet to be used for various purposes.
- The bonding process of creating one plastisol film layer, when passed through I.R. conveyor (bio ceramic heater), obtains heat-resistant, cohesion properties as well as exceptional chemical mixture and superior absorption of inkjet ink to print desired high quality image. Temperature of I.R. conveyor varies in each stage from 120°C to 150°C for duration of 90 seconds.

BEV

TITLE: **DECORATIVE STICKERS MADE FROM INKJET PRINTING APPLICATION**

ABSTRACT:

An article of manufacture for the construction of environmentally compatible stickers which are decorated using inkjet printing methods comprising a polymer plastisol biodegradable rubber resin as its primary ingredient to form one layer from bonding multiple layers. This removable/reusable sticker can even be used for preventing slippery in bathtub. And it is environmental fnendly because of its biodegradable character when discarded. The inkjet printing method application is also effective in reducing number of manufacturing steps or processing stages to create vibrant custom inkjet produced images all at a relatively low cost.

Manufacturing Process

1. Silicon Coated Paper
2. Polymer Adhesive Layer
3. Biodegradable Plastisol Film Layer
4. Inkjet Printing Image Layer (Multiple Color)
5. Plastisol Embossing Layer

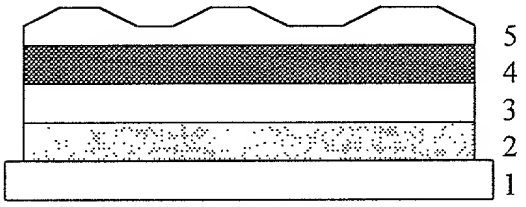

Fig. 1

FIG. 2.

Effects of Invention

Presented invention, adhesive decorative sticker, posses many ingenious characteristics. Its silicon coated base paper does not leave any residue on the sticker and the sticker itself does not leave any residue on the attaching surfaces when removed, yet retains strong adhesive property. Hence, the sticker is removable and reusable. The sticker's ingredient such as rubber plastisol film layer has exceptional bonding quality, thereby maintaining the excellent structural stability and superb elasticity. Also, the sticker's unique printing medium allows all kinds of photo-quality image printing with inkjet print method. The sticker can be manufactured cost-effectively, making it ideal for small quantity sample productions to mass production. Its versatile attributes can be used in countless applications in various types of industries.

BEL

Attorney's Docket No. _____ ***PATENT***

COMBINED DECLARATION AND POWER OF ATTORNEY

(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT, SUPPLEMENTAL, DIVISIONAL, CONTINUATION OR C-I-P)

As a below named inventor, I hereby declare that:

TYPE OF DECLARATION

This declaration is of the following type: (*check one applicable item below*)

XXX☒ original

☐ design

☐ supplemental

NOTE: *If the declaration is for an International Application being filed as a divisional, continuation or continuation-in-part application, do not check next item; check appropriate one of last three items.*

☐ national stage of PCT

NOTE: *If one of the following 3 items apply, then complete and also attach ADDED PAGES FOR DIVISIONAL, CONTINUATION OR C-I-P.*

☐ divisional

☐ continuation

☐ continuation-in-part (C-I-P)

INVENTORSHIP IDENTIFICATION

WARNING: *If the inventors are each not the inventors of all the claims, an explanation of the facts, including the ownership of all the claims at the time the last claimed invention was made, should be submitted.*

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

Decorative Stickers from Inkjet Printing and Method Therefor

SPECIFICATION IDENTIFICATION

the specification of which: *(complete (a), (b) or (c))*

(a) XXX☒ is attached hereto.

(b) ☐ was filed on _____ as ☐ Serial No. 0 /_____
or ☐ Express Mail No., *as Serial No. not yet known* _____
and was amended on _____ (*if applicable*).

NOTE: *Amendments filed after the original papers are deposited with the PTO which contain new matter are not accorded a filing date by being referred to in the declaration. Accordingly, the amendments involved are those filed with the application papers or, in the case of a supplemental declaration, are those amendments claiming matter not encompassed in the original statement of invention or claims. See 37 CFR 1.67.*

(c) ☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (*if any*).

ACKNOWLEDGEMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information

XXX☒X which is material to patentability as defined in 37, Code of Federal Regulations, § 1.56

(also check the following items, if desired)

☐ and which is material to the examination of this application, namely, information where there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent, and

☐ In compliance with this duty there is attached an information disclosure statement in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. § 119)

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

(complete (d) or (e))

(d) XXX☐ no such applications have been filed.

(e) ☐ such applications have been filed as follows.

NOTE: *Where item (c) is entered above and the International Application which designated the U.S. itself claimed priority check item (e), enter the details below and make the priority claim.*

A. PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS APPLICATION AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. § 119

COUNTRY (OR INDICATE IF PCT)	APPLICATION NUMBER	DATE OF FILING (day, **month**, year)	PRIORITY CLAIMED UNDER 37 USC 119
			☐ YES NO ☐
			☐ YES NO ☐
			☐ YES NO ☐
			☐ YES NO ☐
			☐ YES NO ☐

ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION

_____

_____

_____

NOTE: *If the application filed more than 12 months from the filing date of this application is a PCT filing forming the basis for this application entering the United States as (1) the national stage, or (2) a continuation, divisional, or continuation-in-part, then also complete ADDED PAGES TO COMBINED DECLARATION AND POWER OF ATTORNEY FOR DIVISIONAL, CONTINUATION OR C-I-P APPLICATION for benefit of the prior U.S. or PCT application(s) under 35 U.S.C. § 120.*

POWER OF ATTORNEY

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (*List name and registration number*)

Ben E. Lofstedt, REg. No. 25,998

(check the following item, if applicable)

☐ Attached as part of this declaration and power of attorney is the authorization of the above-named attorney(s) to accept and follow instructions from my representative(s).

SEND CORRESPONDENCE TO

Ben E. Lofstedt
P.O. Box 4189
Fullerton, CA 92831

DIRECT TELEPHONE CALLS TO:
(Name and telephone number)

Ben E. Lofstedt
Reg. No. 25,998
(714) 738-8822

DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE(S)

NOTE: *Carefully indicate the family (or last) name as it should appear on the filing receipt and all other documents.*

Full name of sole or first inventor

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(GIVEN NAME) *(MIDDLE INITIAL OR NAME)* *FAMILY (OR LAST NAME)*

Inventor's signature Sang G. Song

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Inventor's signature

Date **Country of Citizenship**

Residence

Post Office Address

Full name of third joint inventor, if any

(GIVEN NAME)	*(MIDDLE INITIAL OR NAME)*	*FAMILY (OR LAST NAME)*

Inventor's signature _____

Date _____ **Country of Citizenship** _____

Residence _____

Post Office Address _____

_____

CHECK PROPER BOX(ES) FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH FORM A PART OF THIS DECLARATION

☐ Signature for fourth and subsequent joint inventors. *Number of pages added* _____.

* * *

☐ Signature by administrator(trix), executor(trix) or legal representative for deceased or incapacitated inventor. *Number of pages added* _____.

* * *

☐ Signature for inventor who refuses to sign or cannot be reached by person authorized under 37 CFR 1.47. *Number of pages added* _____

* * *

☐ Added page for signature by one joint inventor on behalf of deceased inventor(s) where legal representative cannot be appointed in time (37 CFR 1.47).

* * *

☐ Added pages to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (C-I-P) application.

☐ Number of pages added _____

* * *

☐ Authorization of attorney(s) to accept and follow instructions from representative.

* * *

(If no further pages form a part of this Declaration, then end this Declaration with this page and check the following item:)

☒ This declaration ends with this page.